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Notes:

1. Untranslatable words are replaced with asterisks (* **).
2. Texts in the figures are not translated and shown as figs.

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CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1] To acrylonitrile butadiene styrene resin, per this resin 100 weight part, Acrylic acid (meta) system resin of 0.1 - 5 weight part And/or, the acrylonitrile butadiene styrene resin composition for calendering characterized by making an effective dose of pigments for coloring which are chosen from phosphoric ester system metal salts and organophosphate, and which are kinds at least and give a light shielding contain.

[Claim 2] The resin composition thing according to claim 1 whose pigment for coloring is carbon black of 0.5 per acrylonitrile butadiene styrene resin 100 weight part - 20 weight part.

[Claim 3] The resin composition thing according to claim 1 with which the pigment for coloring consists of inorganic pigments other than the carbon of 2 per acrylonitrile butadiene styrene resin 100 weight part - 30 weight part and carbon black 0 - 0.5 weight part.

[Claim 4] The color sheet which forms a resin composition thing according to claim 1 in a thickness of 0.1mm or more which has the total light transmission of 30% or less by calendering.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is acrylonitrile butadiene styrene resin for sheet forming which controlled the light transmittance state. (It is hereafter written as ABS system resin) It is related with the practical color sheet obtained by carrying out calendering of a suitable ABS system resin composition thing and suitable it manufacturing the sheet which controlled the light transmittance state by calendering especially about a constituent.

[0002]

[Description of the Prior Art] Since ABS system resin has the outstanding mechanical property

and the outstanding electrical property and is excellent in chemical resistance, ink adhesion, and an adhesive property, It is widely used in various fields, such as furniture, a household appliance, building materials, or autoparts, by coating for the lamination of the electric conduction trays for precision electronic parts and electric conduction carrier tapes, such as IC, and various plastics metallurgy groups, and functional addition. However, ABS system resin is a time of the detachability from a metal roll being bad and essentially including especially a pigment, Since the detachability from a metal roll gets much more bad, and it is easy to generate an air mark on the sheet taken over in relation to shortage of the exfoliation tension from the roll and uneven-ization of the thickness of an irregular color or a sheet is brought about It was substantially difficult to manufacture the various color sheets of ABS system resin efficiently by the calendar method which was excellent in productivity. Therefore, the color sheet of ABS system resin is chiefly manufactured by the bad extrusion-molding method or injection-molding method of productivity from the former.

[0003]

[Problem(s) to be Solved by the Invention] In view of the actual condition of the above ABS system resin sheet manufactures, [this invention persons] Paying attention to the improvement of the detachability from the calendar roll surface which is a metal roll, many trial production experiments were repeated especially that the method of manufacturing the ABS system resin color sheet which has the physical properties or performance which it originally excelled by calendaring should be developed. Therefore, there is a technical problem of this invention in developing the manufacture method which pulls out smoothly the color sheet of the ABS system resin which was excellent in the Taira slippage with calendaring from a roll. Moreover, there are other technical problems of this invention in offering the ABS system resin composition thing which can manufacture industrially advantageously the color sheet with which total light transmission without an irregular color was controlled, without spoiling the characteristics which were excellent in ABS system resin. The other technical problems or features of this invention will become still clearer from the following descriptions.

[0004]

[Means for Solving the Problem] That is, especially this invention makes a summary the constituent elements of said Claims according to claim 1. [in order that a deer may be carried out and this invention may control total light transmission, are added, but] As an improvement means which raises the detachability from the calendar roll by which the ABS-plastics constituent containing the minerals pigment for coloring of carbon black or others which worsens calendar roll detachability was heated It is characteristic to blend combining the amount of specification ranges of at least a kind of phosphoric ester compounds chosen as ABS system resin from the amount of specific ranges or phosphoric ester system metal salts, and organophosphate of acrylic acid system resin or both [these] components.

[0005] Although selection use of the pigment for minerals coloring of carbon black or others is carried out as a pigment for coloring which controls total light transmission according to a request coloring tone, as an object for black sheet manufacture, independent use of the carbon black is usually carried out. In that case, according to the request light shielding for application of a sheet acquired, selection combination of the quantity of 0.5 per ABS system resin 100 weight part - 20 weight part within the limits is carried out. Moreover, when the color pigment for un-black sheet formation is blended, the amount of addition of 2 per ABS system resin 100 weight part - 30 weight part within the limits is used by a desired coloring tone and the desired degree of protection from light. In that case, according to whenever [all the light transmission inhibition], a small amount of carbon black about below 0.5 weight part can be used together.

[0006] ABS system resin concerning the constituent of this invention is acrylonitrile, butadiene, and styrene a ternary polymerization object to contain as a monomer component, and fundamentally It is constituted by the mixture of the rubber (styrene-butadiene rubber) and the styrene acrylonitrile copolymer which carried out copolymerization with a butadiene independent or styrene, and acrylonitrile. The general manufacture has the polymer blend method (a mere mixed method and a mere latex mixing method) and the typical graft method (an emulsion-polymerization method, a block-polymerization method, and massive suspension-polymerization method). In order to raise the improvement in transparency, or a heat-resisting property, methacrylic acid methylester, alpha-methylstyrene, etc. can also make the proper quantity of other monomer components contain according to the purpose, although the ABS plastics of this invention essentially consist of acrylonitrile, butadiene, and a styrene monomer component.

[0007] [the ABS system resin used for the constituent of this invention] As a main composition monomer component, [acrylonitrile, butadiene, and styrene] What is contained at a weight range rate of 10-30:5-40:45-70, respectively is used preferably. [moreover, the average molecular weight computed by the gel permeation chromatography method of these ternary polymerization object resin] Number average value (M_n) 4.0×10^4 to 9.0×10^4 Range, weighted mean value (M_w) 9.0×10^4 to 3.0×10^5 In the range, the thing of the range of 1.7-5.0 is preferably used for a molecular weight distribution (M_w/M_n). The trade name K-2540 by Sumika ABS Latex Co. can be typically mentioned as such ABS system resin.

[0008] Moreover, the acrylic acid and the methacrylic acid system polymer the acrylic acid system resin which the constituent of this invention is made to contain is indicated to be on "the self-imposed control basis about the food container package made of vinyl chloride resin etc." are used. In this, for example Polyacrylic acid, polymethacrylic acid ester, The copolymer beyond one sort or it of the copolymer of acrylic acid and a methacrylic acid copolymer, acrylic ester, and methacrylic ester, acrylic ester and/or methacrylic ester, and the following monomer is mentioned. As this monomer, acrylic acid, glycidyl methacrylate, acrylonitrile, vinyl chloride,

butadiene, vinyl acetate, vinylidene chloride, itaconic acid, itaconic acid JIBURIRU ester, styrene, methacrylic acid, Alpha-methylstyrene, cyclohexyl maleimide, etc. are illustrated. As typical resin which can be obtained easily, the acrylic acid system resin (trade name: L-1000 and weight average molecular weight $M_w = 2.0 \times 10^5 - 4.0 \times 10^5$) currently manufactured and sold is mentioned from Mitsubishi Rayon Co., Ltd., for example.

[0009] In the constituent of this invention, as for the above-mentioned (meta) acrylic acid system resin, addition combination of the amount of range rates of 0.1 per this ABS system resin 100 weight part - 5 weight part is carried out to the aforementioned ABS system resin. When a carbon black independent is used as a color pigment (meta), the amount of the acrylic acid system resin used [under 0.1 weight part] Since thickness nonuniformity is produced on the sheet which an improvement of the detachability in the heated calender roll, i.e., the addition effect, is not obtained, and is extended very much by the degree in the taking over process in calendaring, it is unsuitable. Moreover, if the amount of addition used exceeds 5 weight parts, since the surface smoothness of a sheet will fall, it is not desirable. As a color pigment, when using minerals pigments for coloring other than carbon black (meta), as for acrylic acid system resin, in relation to the amount of addition of the color pigment, the range of 0.5 per ABS-plastics 100 weight part - 5 weight part is used preferably. Under 0.5 weight part of the detachability from a calender roll is [the amount of addition] inadequate, and since thickness distribution of a sheet also worsens, the addition effect is not acquired.

[0010] Furthermore, the phosphoric ester compounds chosen from phosphoric ester system metal salts and organophosphate combining acrylic acid (meta) system resin are used for the constituent of this invention. Phosphoric ester system metal salts are the metal salts of acid phosphate, for example, the metal salts of monoalkyl ester of acid phosphoric acid, the metal salts of dialkyl ester, etc. are included. As metals which form those salts, calcium, magnesium, barium, zinc, etc. are mentioned, for example. A typical example is trade name: LBT-1830 (zinc stearyl acid phosphite) currently sold [which are selling and Sakai Chemical Industry Co., Ltd. is manufacturing]. Moreover, as organophosphate, nonyl phenyl polyoxyethylene is included and trade name: NO. 1737 by the Akishima chemical industry company (tridecyl polyoxyethylene) are typically mentioned as desirable organophosphate practical, for example.

[0011] Also when [for which these phosphoric ester is chosen from said compound group] a kind is used in the range of 0.1 per ABS-plastics 100 weight part - 5 weight part and is used combining acrylic acid (meta) system resin at least, it is not desirable that the charge of the sum total deviates from the above-mentioned range. In the case of the black sheet which uses a carbon black independent as a color pigment, under in 0.1 weight part, if calender roll detachability is not improved and the amount of addition exceeds 5 weight parts, the surface smoothness of a sheet will fall. As a color pigment in using minerals pigments for coloring

other than carbon black Since surface smoothness will fall if the addition effect is not acquired and the amount of addition exceeds 5 weight parts, since the roll detachability of a calendar becomes inadequate under in 0.5 weight part and thickness distribution of a sheet also worsens When minerals pigments for coloring other than carbon black are used, it is range ***** of 0.5 per ABS-plastics 100 weight part - 5 weight part. Under in 0.5 weight part, the roll detachability of a calendar is inadequate and thickness distribution of the sheet obtained also worsens.

[0012] They may be used to ABS system resin, combining acrylic acid system resin and phosphoric ester compounds, respectively, and can also carry out addition use only of either. Moreover, although phosphoric ester compounds may carry out independent use only of the one kind and it can also use it combining two or more sorts, it should avoid it that those total quantities deviate from the above-mentioned amount of ranges.

[0013] [the pigment used for the ABS system resin composition thing of this invention] Are carbon black as a black pigment, and other color pigments, and [those color pigments] Usually, the pigments known as a pigment for coloring of a plastics material are included. For example An azo lake pigment, insoluble azo pigment, condensation azo pigment, a metal complex azo pigment, phthalocyanine pigment, the Quinacridone system pigment, a dioxazine system pigment, a HERINON system pigment, an ANSURA quinone system pigment, an isoindolinone system pigment, a quionophthalone system pigment, Organic color pigment [, such as a perylene system pigment,]; Red oxide of iron, Synthetic Ochre, titan yellow, chrome oxide, cobalt blue, titanium white, a cadmium yellow, cadmium red, ultramarine blue, Clay, a talc, Berlin blue, chrome yellow, Chrome Vermilion, a zinc chloro mate, alumina white, precipitated barium sulphate, calcium carbonate, aluminum powder, Inorganic pigments, such as a brass powder and mica, are illustrated.

[0014] Moreover, the usually known inorganic pigment [constituent / of this invention] aiming at coloring, For example, white pigments, such as zinc oxide, titanium oxide, and a titanium oxide calcium sulfate mixture; Calcium carbonate, barium sulfate, calcium sulfate, aluminum silicate, Clay, kaolin, bentonite, mica, a calcium silicate, a magnesium silicate (talc), Addition use of metal powder [, such as filler /, such as silica, diatomaceous earth, calcium oxide, magnesium oxide, magnesium hydroxide, and aluminium hydroxide, /; or an aluminium, iron, and brass,]; etc. can also be carried out.

[0015] In obtaining a black ABS system resin sheet in the constituent of this invention, using a carbon black independent as pigments by which addition combination is carried out In using per ABS system resin 100 weight part, carbon black 0.5 - 20 weight parts and obtaining an un-black coloring sheet using a color pigment It is desirable to use properly as inorganic pigments other than carbon black, so that 2-30 weight part addition may be carried out per ABS system resin 100 weight part. When using color pigments other than this carbon black, in order to

lower light transmission depending on the kind and loadings of these use pigment, a small quantity about below 0.5 weight part can be added for carbon black.

[0016]

[Embodiment of the Invention] Next, an example explains this invention still in detail. In addition, % in an example and especially number of copies are based on weight, as long as it is unstated.

[Example]

EXAMPLE 1-14 Comparative example 1-11 And resin and other used substances : ABS system resin [... NO.1737 by the Akishima chemical industry company] ... K-2540 acrylic resin by the Sumitomo *****-**** latex company ... L-1000 phosphoric-ester system metal salt by Mitsubishi Rayon Co., Ltd. ... LBT-1830 organophosphate by Sakai Chemical Industry Co., Ltd.

[0017] Using the above-mentioned material, mixed preparation of the various amounts of constituents shown in the lower ** table 1 and Table 2 is uniformly carried out with a Henschel mixer, calendar ***** of a four inverted-L-shaped roll is used for the obtained constituent, and they are 0.1mm in thickness, and width at the roll temperature of 210 degrees C. It was processed into the 1,000mm sheet. To lower ***** it observed and measured and the method of the description estimated the existence and the total light transmission of the roll detachability at this time, the Taira slippage of the obtained sheet, the surface nature of a sheet, and color tone nonuniformity. With the contents of the ABS system resin composition thing, those evaluations were written together to Table 1 and 2.

[0018]

evaluation criteria: Calendar roll detachability: Good ... Stable manufacture is difficulty bad [O and detachability]... x Sheet Taira slippage: The difference of the maximum of the thickness of the sheet cross direction and the minimum is [Sheet surface nature: Neither a flow mark nor deaeration is in a sheet, and surface nature is good... O sheet has a flow mark and deaeration and it is front planar **** ... x] 7% or less... O, 7% or more ... x Existence of an irregular color: Set into all the portions of a sheet. ** same color tone ... The difference in a partial color tone is on a nothing sheet... It is. Total light transmission: Are based on JIS-K7105. 30% or less of total light transmission of a sheet ... O Excess of 30% of total light transmission of a sheet ... x

[0019]

[Table 1]

選 別 例															
黒色シート															
風色以外のカラーシート															
1	2	3	4	5	6	7	8	9	10	11	12	13	14		
(重量部)															
ABS樹脂	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
L-1000	1		2	2		1.5	3			3	3		2.5	100	
LBT-1830		3	0.5		2	0.5		4		0.5		2	0.5		
NO. 1737				0.5	2		0.005		4	0.095	0.005	2.5	0.5		
カキツアツ	1	2	2	2	2	2	5	0.01	0.1	5	5	0.005	0.005	5	
酸化チタン									0.2				5	5	
群青								0.05							
コバルト青									5						
ベンガラ															
アクリル															
ワグネルレッド															
ローリ制動性	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
シート摩擦性	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
シート変曲性	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
色ムラの有無	無し	無し	無し	無し	無し	無し	無し	無し	無し	無し	無し	無し	無し	無し	
シート光澤透過率	0	0	0	0	0	0	24	8	0.5	24	24	24	24	24	
シート色調	黒	黒	黒	黒	黒	黒	白	灰	米	白	白	白	白	白	
評 価 結 果															

[0020]

[Table 2]

比較例											
黒色シート				黒色以外のカラーシート							
1	2	3	4	5	6	7	8	9	10	11	
100 0.1	100 10 1	100 2 0.5	100 2 30	100 2 1.5 3	100 2 0.5	100 2 40	100 0.5 0.05 4 6	100 10 0.05 4 6	100 1 0.05 5	100 5 8 5	
2	2	0.1	30	1.5 3	0.5	40	0.05 4 6	0.05 4 6	0.05 5	0.5	0.5
ABS樹脂 L-1000 LRT-1830 NO.1737 オボツラサ 熱化チタン 群青 ポリオク タレン ポリオク タレン											
ロール制膜性 カビ耐性 外表面性 色ムラの有無	×	×	×	×	×	×	×	×	×	×	×
シート光輝透過率	0	1	0	0.2	50	0.3	5	5	16	16	赤
シート色調	黒	黒	黒	黒	白	白	黄	黄	赤	赤	赤
評価結果											

[0021]

[Effect of the Invention] The ABS system resin composition thing for calendaring of this invention, On the occasion of the sheet forming by the calendar method, the outstanding characteristics which the aversion to a roll is good and ABS system resin originally has are not spoiled, but, moreover, it excels in the surface nature and the Taira slippage of a sheet, and there is no irregular color and the other black and coloring sheet of a light sheilding is obtained for high productivity. Moreover, it excels also in ink adhesion and an adhesive property, and the obtained sheet is coating for the lamination of the various plastics metallurgy groups as the

electric conduction trays for precision electronic parts and carrier tapes, such as IC, and functional addition, It is applicable to wide range uses, such as furniture, a household appliance, building materials, and autoparts.

[Translation done.]